

The Atmosphere

EARTH'S ATMOSPHERIC LAYERS

Earth's atmosphere surrounds us like an invisible ocean of gases and particles that has no definite boundaries. It extends outward from the surface of Earth for thousands of kilometers. While the atmosphere is often thought of as nothing more than air, it works as part of a system that includes the sun, oceans, and land surfaces. Scientists are still trying to unravel the mysteries of weather and atmospheric chemistry.

The lower parts of the Earth's atmosphere are well mixed. Elements such as oxygen, hydrogen, and nitrogen are found at near constant proportions around the globe. This bottom layer is called the **troposphere**. It is the lowest part of the atmosphere, where weather occurs and where we live. The troposphere extends up to about 15 Kms where it is divided by the **tropopause**. As you travel higher in the troposphere, the concentration of oxygen decreases. That is why high-altitude mountain climbers often experience breathing problems. The tropopause separates the troposphere from the next layer: the stratosphere.

The **stratosphere** extends some 35 Kms above the Earth. This layer contains a very important gas called ozone, which absorbs the sun's harmful ultraviolet radiation. Within the past 15 years there has been a great deal of research conducted on the stratosphere because there is concern that ozone concentrations are diminishing. Much research has been conducted on the complex processes that affect ozone concentration. Scientists have found that, indeed, ozone is being depleted as a result of the production of large amounts of chemical compounds called **chlorofluorocarbons (CFCs)**. The nations of the world have established a ban on CFC emissions in an effort to protect the ozone layer in the stratosphere. As well, planes fly at this atmosphere.



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WHERE IS THE EARTH'S WEATHER FOUND?

The **stratosphere** and the next layer, the **mesosphere**, are called the middle atmosphere.

They are divided by the **stratopause**. The mesosphere extends to 30 Kms above the Earth and is where meteors (falling stars) burn up.

The **thermosphere** rises above the stratosphere to a height of about 900 Kms above the surface of the Earth. The **mesopause** separates the mesosphere from the thermosphere. The atmosphere is very thin here, about one hundred-thousandth (1/100,000) the density of air found at sea level. It is here where satellites orbit the Earth.

Above the thermosphere is the ionosphere. It is named the ionosphere because electrically charged particles called ions are found there. Radio waves can be bounced off the ions to send messages throughout the world. Solar flares cause disturbances in the ionosphere that can disrupt radio, telephone, and TV satellite communications.

Extending above the ionosphere is the **magnetosphere**. It stretches nearly 10,000 Kms beyond the surface of the Earth. It is a magnetic field.

For homework, construct a detailed 3-dimensional representation of the Earth's different atmospheric layers. Your model must be to scale and is recommended that you only include the troposphere, stratosphere, mesosphere, and thermosphere. The ionosphere and magnetosphere should be labeled at the top of the model but not to scale!! Include label, size of each layer and examples of what can be found there.

Due Monday February 14. Allow creativity to "rain". Out of 15 marks.